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ABSTRACT

Information from the American Institute of Medical Climatologists on human responses to weather and climatic conditions, including clouds, winds, humidity, barometric pressure, heat, cold, and other variables that may exert a pervasive impact on health, behavior, disposition, and the level of efficiency with which individuals function is reviewed. These topics are discussed: (1) environmental effects: (2) cold weather effects: (3) hot weather effects: (4) weather's effects upon ailments, including arthritis, asthma, headaches, common colds, bronchitis and emphysema, ulcers and intestinal disorders, heart disease, hypertension, leukemia, eye disorders, and feeling pain: and (5) psychological effects of weather and climate. Included are suggestions for ways that individuals can adapt to changing weather conditions or select climates most suitable for their individual differences. (CS)

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Weather, Climate, and Y ou!

The American Institute of Medical Climatologists is an informal group of physicians, physicists, and meterologists. Its members have offered many fresh insights and clues to the human responses to weather and climatic conditions. Some other medical scientists have also offered theories linking weather and climate to health. They all share the view that clouds, winds, humidity, barometric pressure, heat, cold, and other variables - the very complex natural phenomena that we call "weather" and "climate - may exert a pervasive impact on health, behavior, disposition and the level of efficiency with which individuals function.

(A) Environmental Effects:

It is a well-established fact - people do respond to virtually every change in the air mass that covers the earth. Variations occur in pulse rate, body temperature, blood pressure, urine - the many metabolic and chemical processes of the body. As one might anticipate, individual differences exist in the responses to environmental shifts, just as such differences exist in age, weight, body build, endocrine functioning, and genes. For example, sudden shifts in temperature affect some people more than they do others. And sudden severe changes in weather have the greatest impact on patients who suffer from arthritis, headaches, asthma, heart disease and mental illness. In addition, such changes have been known to bring on strokes and hemorrhges.

Helmut E. Lansberg, president of the American Institute of Climatologists and a University of Maryland meteorologist has observed:"Modern living has impaired our adaptation. The primative person who lived in direct contact with his environment was capable of adapting. But most of us today were brought up in a hothouse environment, so we are not elastic enough physiologically and psychologically.

It is now known that body responses vary with the seasons. For example, we're highly vulnerable to one kind of disease and resistent to others at certain seasons. In the summer, as a case in point, we are less likely to catch a cold than during the winter. Landsberg further notes; "The Good Lord did not standardize us very well. Some human beings react markedly to cold, others to heat, and we are all influenced by our living

habits. Many people seem to be entirely untouched by weather or climate, probably because they are better adapted to their environment. Some people react only to severe changes in weather. And there are other man, women, and children, who suffer from even the slightest change of weather."

Over the years, climatologists have learned some things about c ertain elements in our environment. These facts, and other surmises, include the following:

1- About winds:

The Greek physician, Hippocrates, considered the medical consequences of various winds important in the study of medicine. He maintained that hot and cold winds have a bearing on the outbreak and the course of disease.

The hot, arid sirocco of North Africa brings with it a sense of oppression as does the cold, dry mistral that blowd through the Rhone Valley of France to the Mediterranean. One surgeon in Vienna is reported as saying that when the warm, dry foehn blows, it gives rise to a general tension; wounds become infected, sutures break, medical complications arise.

Fungi allergies are suffered by many people and winds do carry the spores that lead to certain asthmatic attacks. Also - a disease common in some areas of the Southwest, "ddesert rheumatism" id also caused by airborne spores of fungi.

2- About storms:

There are some people who are highly susceptible to the electomagnetic waves that come from thunderstorms: they can even sense a storm many miles away. Some may react by getting agitated and hyperactive. Others - conversely - may feel drowsy.

In 1938, during the New England hurricanes, students at Massachusetts State College taking standardized tests during the passage of the hurricane scored 20 points above the usual performance at that college. Landsberg cautions, however: "But we can't rush to proclaim that hurricanes raise intelligence. Such a natural coincidence has never been repeated. Yet we should not discount the power of abnormal weather conditions (to affect) mental performance."

3- About the falling barometer:

Barometric pressure measures the weight of atmosphere, usually expressed in terms of the height of a mercury column. When air pressure increases markedly, barometer readings rise considerably, causing a greater weight on the exterior body. Under these conditions, the blood does not move along as easily to the heart. Conversely, when air pressure decreases, barometric readings fall. Sharp drops in such readings have effects similar to what is experienced at high altitudes. These may result in the oxygen content of the blood being lowered. This creates a shortness in breath. And people suffering with angina are adversely effected by such drops in air pressure.

Before a storm, when winds rise, the temperature shifts and humidity also rises - barometric pressures are invariably low. Under conditions of the barometric pressure readings falling, some people are prone to be edgy; some youngsters will go ona sudden rampage of vandalism; more people complain of insomnia. However, individual differences in reactions are again evident for some individuals become irritable or depressed whereas others wax enthusiastic.

Reduced air pressure that relaxes people appears to explain the following: a meteorologist reporting the results of a two year study at Boston's Noetheastern University noted that low barometric readings appeared to correspond with increased sexual activity.

4- About humidity:

It has been noted that the lack of moisture in the air can do as much harm to individuals as does extreme cold. Although the dry cold winter days may feel stimulating,these are not necessarily as good for you as they seem to feel. Also - except at extremely high temperatures - all other temperatures accompanied by moist days, are healthier than days of humodoty dryness; i.e. 'low' humidity. Heated rooms, during cold weather, may become uncomfortanly dry if the air is not artifically humidified. In fact, the extreme dryness can cause throat and nose irritation.

(B) Cold Weather Effects

Resistence to cold; i.e. low temperatures, obviously varies with the

kind and amount of clothing worn. Additionally, it also varies from individual to individual. Thin people, (not well insuled by fat!), tend to react unfavorably to cold temperatures. They also may become mentally and physically tired and lose their customary pleasant dispositions.

Thin people may also be more conscious of cold because they store less energy and water. As a consequence, they are not as well prepared to ward off the shocks of shifting weather conditions. Some studies in Chicago revealed that more slender persons commit suicide than do stout people when unsettled cold weather occurs.

Some experiments by British scientists showed that obese men, women, and children are better equipped to fend off winter's cold than are those individuals with heavy muscles. However, there is a tradeoff here, for beinf overweight does increase vulnerability to frostbite - a traumatic condition in whcih body cells are destroyed and small blood vessels become obstructed. In severe cases of frostbite, frozen parts of the body may become gangrenous and necessitate amputation.

During severe cold weather arms, legs, noses, and ears are most prone to frostbite. For noses and lips this hazard increases because of the condensation and subsequent freezing of moisture from the breath. Because feet lose heat rapidly, when they perspire, or when melted snow enters shoes, without well protective shoas, feet too are often subject to frigid-weather frostbite. Another hazard for overweight people is trench foot which results from prolonged exposure to cold and wet. In contrast to obese people, thin people are more prone to keep a higher skin temperature, partly by shivering.

Contrary to common belief, mild winters are not unhealthy. Some studies in northern state city departments of health have indicated that mild winters actually are accompanied by sharp drops in mid-winter diseases. However, sudden changes in winter temperatures do seem to be related to high incidence of illness. Dr. Lawrence H inkle of the New York Hospital - Cornell medical Center has commented: "A prolonged cold spell accompanied by the passage of a cold front and by the occurrence

of rain and snow, can have a transient effect almost as great as that of an epidemic."

Indirectly, cold weather can also affect you. During the winter months, when people are more apt to be in confined and possibly crowed places, there are flare-ups of some contagious diseases, such as influenze.

(C) Hot Weather Effects

Normally the environment needs to be relatively cool in order to enjoy a good nights sleep. However, if body temperature does not go down because it's a hot night, sleep may elude the individual. The problem is that during hot weather, one's metabolism is not reduced to the point that it slows down - the individual stays stimulated and cannot sleep. There are also some researchers who believe that exceedingly hot weather reduces fertility, boosts the incidence of violence, (the folk wisdom encapsulated in the phrase - "long, hot summer!), and proves harmful to heart patients.

Among obese people, it appears especially acute for them to withstand blistering heat. It is presumed that for them, their thyroid and endocrine glands don't function well during such hot weather.

Without regard to obesity or slenderness, when temperatures soar, one often slows down and one's performance, both mental and physical, is adversely affected. A heat wave, (i.e. constant, unrelelieved heat), may sap both physical and mental vitality. One may become irritable, and lose one's temper with one's associates - co-worjers, friends, spouse, children.

Among infants under six months of age, they are extremely sensitive to weather conditions, presumably because their heat- regularity system is not yet fully developed. For babies, hot climates present a special risk because of their relatively greater turnover of body water. They must rely entirely on others to increase their fluid intake during hot spells.

Among adults over 65, according to the findings of some physicians, the heat-regulatory mechanism begins to break down. Thus, older adults may suffer from both hot and cold weather conditions.

Among women, they have a greater number of sweat glands than do men, and it is thought that they perspire more readily. Since perspiration helps to cool body temperature, (especially during dry weather when perspiration can quickly evaporate), this would suggest that women would adjust more readily to hot weather. However, some researchers report that women are less able to tolerate and accomodate to heat than do men. At present, there are no known reasons for this difference.

Under 'heat wave' or 'hot spell' conditions, when both temperature and humidity are high, the body's system that normally maintains a constant temperature could break down. It is not at all uncommon for people exposed to a hot climate to experience sensations of nausea, giddiness, and general discomfort; they may even faint. The most disasterous consequences of unbearable heat are heat stroke - sometimes identified as sunstroke, or heat collapse, and what is labeled as heat exhustion.

For heat stroke, the first signals are: the skin becomes dry and hot ,sweating ceases, the face flushes, the pulse is rapid. Other symptoms include a rapidly mounting fever, nausea, headaches, rising blood pressure and perhaps complete prostration. Heat stroke may be preceded by symptoms of heat exhaustion.

For heat exhaustion, a condition in which the body has released heat far too quickly, symptoms include: body temperature and blood pressure drop, the skin turns clammy and cool, the face pales, the pulse is weak. Perspiration is profuse, especially on the face and forehead.

Heat cramps, which are generally accompanied by fever and nausea, are caused by too much loss of body salts and water, through perspiration. Drs. George E. Burch and Nicholas P. DePasquale report that... "heat cramps are associated with painful muscle spasms following muscular activity in a hot and humid environment. (During) heavy physical work, the load placed on vaporization of sweat to remove body heat is greatly increased. However, if the relative humidity is high, the evaporation of sweat is impaired, thus reducing the efficiency of heat loss by sweating .... People living in tropical climates have learned to reduce their muscular activity during the hot periods of the day."

These two doctors further n oted that heat exhaustion and heat stroke ... "may be more common in the temperate zone than in the tropics. Inhabitants of such cities as Boston and Cincinnati are accustomed to, and physically adjusted for cool weather. They have relatively high metabolic rates. During severe and prolonged early seasonal heat waves, the difficulty of heat elimination combined with physical exertion and a high metabolic rate creates situations in which breakdown in the thermal regulatory mechanism is likely to occur in susceptible persons."

Heat exhaustion is tied to prolonged periods of hot weather. It is triggered by too much exposure to sun and by physical exertion. Poor health, inadequate intake of salt and water, and lack of acclimatization are predisposing factor s. So are inadequate rest, wearing unsuitable clothes, and overeating. Even a single bout with heat exhaustion makes the person subject to future attacks. According to Drs. Burch and DePasquale, most victoms of heat stroke are people aged 60 or over, or people with debilitating illnesses like hypertension, diabetes, and arteriosclerosis. Obesity also increases vulnerability to heat stroke.

City heat islands

During a heat wave, prostration and death are most likely to occur in cities. During bright, sunny days, asphalt, stone surfaces, and roofs heat up. When the temperature is high day after day, the heat, trapped between tall buildings, on sidewalks, and even in subways, accumulates more so than in rural and suburban areas.

Helmut Landsberg, in a survey, determined that city heat islands impact is most evident on calm, clear evenings, a few hours after sunset, when weak winds prevail.

The sun's impact

Many people find serenity and a feeling of vitality while enjoying the warmth of solar rays. With our tan, we believe we look physically fit and youthful too. However, madical authorities look upon tanning as a far: far too much sun is a threat to health. According to dermatologist Farrington Daniels, Jr. of Cornell Medical College: "While fresh air, relaxation, and recreation in the sun are good for you, we don't

know whether tanning itself is beneficial." Other dermatologists indicate that a tan is only of psychological value for the average person.

Severe sunburn, classified as a first-or-second-degree burn, can mean blistering and agonizing pain. If widespread areas of the skin are involved, there may be a poisoning reaction throughout the body resulting in shock, chills, fever, and even delirium.

Additionally, long-term exposure to the sun's ultraviolet light rays can cause degenerative skin changes, giving the appearance of premature aging. Many people who were exposed too often to sunshine in their twenties look more like sixty when they've only reached their late fourties. Of far greater import, the breakdown of tissues because of sun damage can set the stage for skin cancer. However, dermatologists have long recognized that a moderate amount of sunlight can benefit patients with such skin diseases as psoriasis, eczema, acne, and pityriasis rosea.

As a matter of sensible health care, everyone should guard against the harmful effects of excessive sunlight exposure or to extreme heat or cold. In addition, individuals having particular health problems may find that even 'normal' seasonal weather changes can be troublesome.

(D) Weather's effect upon ailments

Some 160 doctors specializing in internal medicine were asked: "Do you believe there is any significant relationship between symptoms of disease and the weather?" Some 92% responded affirmatively, many of them indicating that specific weather conditions worsened the condition of arthritics, ashmatics, cardiacs, and people with various other ailments.

This survey, as well as other research studies by medical climatologists, evidence how varying environmental elements can have a direct bearing u pon health and feeling of well-being. In particular, this applies to the following specif ailments:

(1) Arthritis:

A weather-sensitive, middle-aged woman predicts: "I'm sure we'll have rain tonight." This amateur weather predicter is not imagining things. Perhaps more than any other disease, arthritis - the disease of joint inflammation - is directly affected by weather.

In one study of 12 hospitalized arthritics, they reported that their joints started to ache and they felt progressively worse with the arrival of a specific weather change - a combination of rising humidity and falling barometric pressure. Some, infact, were so weather-sensitive that they began feeling worse even before the barometer began to nose dive!

In one sense, people suffering with arthritis are living barometers. Evidently humidity activates the skin in a manner permitting blood and water to flow more freely within the body's system. This, in turn, triggers an internal physiological reaction that affects large joints especially. Shoulder and hip joints have cavities with albumin-like fluid that lubricates them. As the outside atmospheric pressure falls, the fluid content of the tissues apparently increases. The consequent swelling of the tissues offers more resistence to motion. It is this resistence that causes pain in arthritic joints. Typically, this type of response is more common in cold, moist, stormy climates rather than in warm, dry, calm regions.

(2) Asthma:

It is significant that the most consistent reporting in the previously-cited survey among 160 physicians related to asthma. Death records of asthmatics show a large number of fatal asthma attacks occuring shortly after severe weather changes.

Many asthmatics are allergic to pollen, animal dander, spores, dust, molds. Obviously, strong winds carry these pollens and other substances. However, even when the air is clean, atmospheric changes may precipitate attacks.

Asthmatic spasms are usuall y associated with the <u>first</u> wave of cold air - an intense storm center that may suddenly follow pleasant weather in late summer or early fall. And the increased hospital admissions of asthmatic patients during such periods of sudden cold are clear evidence of this relationship.

This same phenomenon, in a study of children with bronchial asthma, was reported by Dr. Arie Ribon and associates at New York Medical College. In his words: "The influx of cool air has less of an effect on their asthmatic attacks in the winter than in the fall. ... Extreme changes in climatic conditions can at time precipitate or worsen paroxysms of asthma."

Precisely how these weather cond itions provoke attacks has not yet been determined by researchers.

(3) What precipitates headaches?

Results of some recent headache research projects indicate that they were provoked by a variety of physical and psychological stress. However, the participants did not feel that weather exacerbated their migraine headaches.

Among the various triggering elements, bright sunshine and snow glare decidedly b oosted the number of severe attacks. Perhaps the number might have been even higher, for many of the participants were protected by wearing tinted glasses in the sunlight. Considerably more than the usual number of attacks occured under weather conditions of low humidity before a dry wind. And also, quite a few individuals reported having migraine headache a tacks during thunderstorms.

It is generally reported by climatologists in the United States that about half of all migraine sufferers react adversely to extreme temperatures - either hot or cold.

(4) What about the common cold?

No one needs to be told that they are physically more vulnerable to colds in winter than in the summer. Yet, weather conditions simply affect the person's susceptibility: in short, they do not cause the cold.

Numerous bacteria and viruses, (a cold is a viral infection), exist within the body sll the time without causing harm to the host organism. However, certain conditions, such as chilling, make an individual less resistant to such viruses. In short, you "catch cold".

When outdoor temperatures drop to freezing, this places a strain on a person's heat-regulating mechanism. For example, stepping out into a snowstorm without a warm coat and muffler, or getting one's shoes soggy on a rainy day, taxes one's heat-regulating system, thus wearing down one's defenses against infection - even when one is healthy!

The all-too common cold responds to the erratic weather changes of stormy weather. Temperature shifts are constant; barometric pressure swings high and low like a yo-yo; the humidity is high, then low; strong

winds suddenly alternate with dead calms. Such changes can lead to either local or total-body chilling which, in turn, predisposes the body to the viral infection labeled ' a cold'.

A British study found that colds occur more readily when people are fatigued; when they are below the level of their normal fitness; and when outside temperature fluctuate. These research scientists reported: "Most people live a fairly regular routine of work, travel, and home environment to which the body becomes accustomed. It is only when they are confronted by a sudden large temperature occilation.... repeated on more than one occasion, that failure of thero-regulation results in a cold."

(5) & (6) Bronchitis & Emphasema:

"The worst cases of lung ailments like chronic bronchitis and emphasema turn up during a combination of very damp weather and very heavy outside and inside air pollution", says Dr. Hinkle. "It is seen particularly in climates similar to those in Britian and Belgium."

In a city with many pollutants in the air but little wind blowing, the air becomes stagnant. Under these conditions, breathing becomes more difficult. If the respiratory system is already impaired, a decrease in available oxygen makes it particularly difficult to get enough air for breathing. In a heavily polluted city, under conditions of a very calm evening, coupled with clear skies, this leads to a concentration of air pollutants. For people with lung or heart ailments, this means trouble, for they respond to these particular conditions.

(7) & (8) Ulcers & Intestinal Disorders:

It is the belief of some doctors that certain people who are prone to stomach ulcers may suffer episodes of bleeding during a sudden cold wave. A Philadelphia General Hospital study of duodenal ulcer patients partly supports this theory. It was shown that one of the peaks of hemorrhages showed up during October and November, when temperatures varied widely.

In a warm climate where there are relatively few daily and seasonal shifts in temperature, someone inclined toward ulcers may have less trouble. On the other hand, in a temperate climate, the ulcer patient

should take precautions against undue exposure to a sudden cold snap in the fall.

Regarding other intestinal disorders, constipation seems to be more prevalent during cold weather. As one doctor has suggested, it may be a result of less exercise and lower fluid intake, ot a result of the weather itself. Diarrhea, a common hot-weather occurrence, is easier to understand; heat stimulates bacterial growth and food becomes contaminated more readily during such warm weather.

(9) Heart disease:

It is an established fact that weather and climate have distinct impacts on heart ailments individuals. Most of the studies in this area, (one perhaps in which more research has been done relating to weather and health than in any other area), find a high seasonal incidence of coronary occulusion or myocardial infarction (heart attack) on very cold days. Climatologists in Philadelphia learned that 3 out of 5 heart attacks occurred when a cold front appeared abruptly and both the thermometer and the barometer dropped precipitously.

Extreme heat may also be a factor in heart ailments. For example:

(a) a New Orleans survey revealed more heart patients entering hospitals, (and more deaths from heart disease), in August than in other months.

(b) In New York, it was noted that a great increase in the number of heart disease fatalities came right after the hottest day during two heat waves. According to Dr. F.P.Ellis who participated in a study of these heat waves, "The added heat burden after 14 days of hot weather proved utterly intolerable for ... 151 people who would not have died if the heat wave had ended earlier." Most of the people who died during these heat waves were 65 or older.

(c) In Dallas, doctors reported that most heart patients who had an attack durring a sudden onset of hot or cold weather were either asleep or resting at the time. So physical exertion was not involved, nor was the heat or cold itself the only factor. It was the strain of adapting to the weather change that apparently caused the attacks.

(d) According to the 160 doctors polled in the previously-mentioned

survey, spells of muggy or foggy weather can also be precipitating factors in heart attacks. Many indicated that they believed cardiac patients suffered more shortness of breath under those conditions. The reasons for this: heat retention by the body increased the rate of metabolism, thus adding to the load on the heart.

The elderly, in particular, suffer when barometric pressure goes up. This was clearly demonstrated in a National Heart and Lung Institute study in Chicago of the records in more than 14,000 deaths of coronary patients. The hour, day, and month of death were compared with weather information records. One interesting finding was that exposure to heavy snowfall may be the cause of an increased rate of immediate death among heart patients. This heavy snowfall element affected more women than men, possibly because men in general spend more time outdoors and their bodies may therefore adapt more readily to weather changes.

And finally - the pains of angina pectoris victums are usually more severe during a cold snap; in cold winds; and on hot days.

(10) Other conditions:

Suffereres from hypertension (high blood pressure) should be aware that blood pressure usually rises in cold weather, (a perfectly normal reaction), and tends to go down on warm days. However, for anout 1 out of each 3 people, the opposite happens - and presently there's no known explanation for it. Also noted has been that a move to a mild climate usually is accompanied by a drop in blood pressure within a year or two.

Leukemia is said to appear initially more often in winter months, and has its lowest incidence in summer months. Dr. Mary Kaufman of Long Island College Hospital surmises: "Certain people are peculiarly susceptible. Their immune response to certain stimuli is abnormal; therefore they'll develop the disease, though other people can resist it. But there has to be a trigger, a sensitizing agent that increases susceptibility - maybe a viral infection. We all get many more viral infections in winter."

On the other hand, eye disorders are more likely to occur on warm days when the air is polluted.

(11) Some special medical considerations:

Special weather bulletins

in Hamburg, Germany, alert surgeons as to whether it would be wise to do elective surgery, (other than emergency operations) that day. This service is based on studies in which surgeons and meteorologists compared results of thousands of operations - most particularly cases of post-operative bleeding and embolism - with weather at the time. Evidently some patients (for example, those with poor circulation) react badly to certain weather conditions. These reports enable hospital staffs to pay special attention to them.

Also affected by seasonal changes is human fertility. Both physical and sexual vitality seem high in late spring; May and June. This is the period when outdoor temperatures in temporate zones are 65°. It is also the time that healthy sperm are most active and women most fertile.

Winter temperatures average below 40°, and summer temperatures rising above 70°, generally make women somewhat fertile. This, of course, varies according to climate zones. For example, in Montreal, fertility hits its peak in midsummer, (seldom really hot there), and it sinks lowest in the steady cold weather of winter. In Tampa, Florida, fully a third fewer conceptions take place in the summer heat than during the mild winter coolness.

A general effect of environment on pregnancy has also been noted. Research reveals that a change of air mass in any direction, (either from warm to cold or cold to warm), helps trigger eclampsia, a condition which may result in convulsions in late pregnancy or during labor. (Note:- good prenatal care minimizes the chnaces of eclampsia occuring).

The manner in which the body responds to medication may also be affected by weather. Years ago, researchers testing the medication digitalis, (prescribed for heart patients), found that equal doses from the same batch of medicine showed day-to-day differences. These fluctuations appeared to follow weather conditions, experiments showing that this drug was more toxic during storms than under calm conditions.

Where sedatives or narcotics are involved, the altered effects are particularly important. Experiements during weather disturbances indicated that at those times smaller doses of morphine were lethal than during

quiet weather. Also - when weather temperatures were high, effectiveness of certain sleep-inducing drugs was reduced.

Insulin, prescribed for diabetes, seems to be somewhat weather-dependent in its action: a patient's exposure to cold apparently slows the response to this drug. Also affected by weather is the action of diuretics, often prescribed for high blood pressure, kidney disease, and heart ailments because it helps patients secrete and excrete more fluids. On hot days people sweat more and on cold days they urinate more. Thus, a patient who is on a fixed dose of diuretics, and who, because of the diuretic and the cold weather, excretes too much urine could, conceivably become dehydrated.

(12) Feeling pain:

Climatologist Landsberg tells us that pain has a seasonal trend. It is more common when the weather is wet and stormy than when it is sunny and dry. In fact, in folklore the idea was generally believed that certain people could "feel" the weather changing because of their pain, as arthritics do. Generally these aches stem from a physical impairment. However, they can also be due to sensitivty of scar tissue. The scar usually involves some reconstituted muscle, and the repaied cell structure reacts differently to environmental changes than older tissues do: the result is pain.

(E) The Psychological Impact of Weather and Climate

For many of us, we are aware - intuitively - that both our emotions and our personalities are related to the climate in which we live. So much so is this true that it is reflected in our language: "hot-tempered", "sunny disposition", "cloudy thinking", "he stormed into the room", "he's foggy-brained" are but a few of such examples.

(1) Shifing moods:

There are people who are extremely sensitive to weather. They seem to respond in their behavior to every cloud that blocks out the sunshine. It seems like every shadow and ray of sunshine keeps their emotions shifting from elation to depression, and on days of steadily falling barometric pressure they sink into morose moods.

The precise mechanism behind this is not presently known. A pioneer climatologist, Dr. William F.Peterson, thought it's due to shifting chemical balances in blood and body tissues. Also - findings of other scientists imply that our tissues take up more water in humid weather and a resulting slight swelling of the brain may upset us emotionally. As yet, the evidence is not entirely convincing.

Many people become dejected when they experience a spell of continuing monotonous weather. And accoring to studies by a University of Illinois psychologist, children are most apt to be troublesome on low barometric pressure days.

In general, apparently people look better to each other, and themselves, as well as feel better when the barometer is rising.

(2) Weather and work:

Some researchers report that mental faculties function at peak efficiency on cool and dry days, but that a prolonger period of clear blue skies reduces prod uctivity. And after a period of pleasant days, a cloudy or rainy one seems to boost work output.

Are there ideal weather conditions for work and health? Many climatologists agree it's an average temperature of 64° and about 65% humidity, both day and night. It is no wonder that workers produce less, of poorer quality, when they are exposed to an uncomfortable atmospheric environment. Under these circumstances stenographers transcrive their notes more slowly and make more mistakes. Hot days in schools interferes with the learning process, and with air conditioning functioning, fewer errors are made on tests. One study in England concluded that student school performance apparently improved when the air was cool and dry, with high atmospheric pressure.

Contrary to popular notions,as for physical work one does not do better during cold weather. Quite understandably, most everyone moves a little livlier in the winter to keep warm and this may give the impression of more pep. But in point of fact, body efficiency drops because energy and combusion levels must rise to maintain body heat. In the cold, it simply takes more energy to perform a given task than it does in milder

weather.

(3) Erratic behavior:

A number of researchers have noted links between atmospheric pressure and restlessness, accident proneness,, and a tendency to violence. Director of psychological services at Vermont State Hospical, Dr. Robert V. Conquest, reported that a sharp change in atmospheric pressure in either direction - triggers more of what he terms "actional behavior" - (i.e. more aggressive acts, self-destructive behavior, traffic and industrial accidents).

A study conducted in Canada noted that most car accidents occur when the barometer is falling. One explanation is that falling pressure causes tissues to swell. This slows down blood flow and increases pressure on the brain. Among susceptible persons, these changes in turn generate irritability, apathy, fatigue, or other conditions which may lead to accidents.

Being uncharacteristically forgetful some days could be due to low atmospheric pressure. This is what Tokyo researchers learned, for when the barometer was falling; lost-and-found offices were unusually busy because more passengers left packages and umbrella in buses!

(4) Mental illness:

Feeling jittery before a storm breaks is quite understandable, for swift weather changes affect emotional stability. In fact, mental patients who are temperamentally unstable become easily upset and fatigued during almost any atmospheric disturbance.

Dr. William F. Peterson has noted that as a result of oxygen-hunger... "more potentially psychotic individuals become psychotic during certain weather conditions." This occurs because the central nervous system is particularly susceptible to changes in oxygen supply and the weather has a lot to do with such changes.

Psychiatrists at mental institutions have reported the ways in which patients' behavior parallels certain kinds of weather. In one instance, a 22-year-old patient had 6 violent episodes in a few months - all of them when the temperature was abnormally low. In another - a middle-aged women became homicidal on 3 nights within the same month,

each night one of the coldest of the year.

Neuropsychiatrist Hans H. Reese of the University of Wisconsin maintains that weather accounts for some psychotic episodes. For example, a storm may bring on criminally insane behavior. And suicide attempts seem to be more likely when the barometer is falling.

(5) Crime, heat and humidity:

Surveys in this country, and abroad, agree that crime mounts as the weather heats up. In July, the crime curve and monthly temperature curve are practically identical.

In Philadelphia, medical climatologists working with the Police Department and the Medical Examiner's Office, once correlated data on about 40,000 major crimes with the temperature and other weather factors. This they did on the specific hour and day on which each crime was committed. They concluded:

(a) On warm, muggy days and nights when temperatures averaged about 80^0 and skies were cleaar - murder, rape, and aggravated assult increased considerably - about 45%.

(b) On dreary days when the sky was overcast and the air very humid, though the temperature was only about 70^0 - such crimes of violence soared by about 30%.

(c) During the hours and days when the weather was seasonably comfortable, the air dry and crisp, (and shortly after a period of bad weather), the crime rate dropped 75%

Thus humidity in the air emerges as a possible "accessory" to the acts of killers and rapists: presumably, humidity aggravates aggressive impulses.

Dr. Frank C.J. McGurk of Villanove University, who directed this Philadelphia project commented; "The incidence of crime is not a randomized affair. There are peaks and valleys in the crime rate that are not accounted for by the day in the week or hour of the day. It looks as though they are caused by an external factor such as the physical environment."

In the New York study of heat waves, however, Dr. Ellis reported

that homicides increased after the heat wave was over: no interpretation of this fact was offered.

During "long hot summers" when a combination of high temperature and high humidity - unrelieved by the comfort of air-cooled apartments - seems to intensify reactions to difficult conditions: riots have broken out. And in Southeast Asian countries, the period just before the summer monsoon has been known to provoke people into running amok. With the cooling monsoon rains, tranquility usually returns.

(F) The Climate Connection

What, if anything, can we do about the weather? How can we best protect ourselves from the hazards of too much heat, too much cold, too much humidity, two much dryness, and overly rapid shifts in temperature?

Dr. Lawrence H inkle contends; "Where you live is secondary. Since most people spend so much of their time indoors - at home, in the office, at the factory - generally man-made climate is the controling factor." However, most other medical climatologists disagree. They contend that climate is one of the factors that:

(a) affect the rate of human growth.

(b) fertility of mind and body, and

(c) the amount of energy available for action or thinking.

Drs. Burch and DePasquale put it this way: "Geologists, archaeologists and historians have advanced theories by which the rise and fall of civilizations, the energy of nations, mass migrations, religious activity, customs and mores have been largely influenced by climate."

Generally, residents of cold climates, where natural conditions allow their tissue fires to burn more brightly, move vigorously. In order to survive the heat, people in the tropics have to move more slowly.

In the tropics, average life expectancy is low in many areas due to inadequate public health service and adequate sanitation. However, people who do survive to an advanced age in the tropics show much less evidence of aging in their bodies than is seen among people of similar years in the temperate zones, where bodies wear out. In temperate coolness

the stress of a more energetic life appears to cause frequent breakdowns in body machinery and make heat failure a leading cause of death.

(1) Move for health reasons? Should one with a chronic ailment such as bronchial asthma or sinusitis migrate to a 'better' climate if afflicted? Of course, no one seriously claims that climate alone will "cure" an illness. The most basic consideration is proper medical treatment. But - a favorable climate can improve the effectiveness of therapy, whereas a bad climate may cancel out its benefits. In addition, a good climate may prevent an illness from becoming more serious, and may even reduce attacks and acute episodes. For many, a climate favorable to their particular illness or poor health problem can mean the difference between a life of pain or invalidism and a life od health and activity.

Some medical authorities recommend the American Southwest at 4000-5000 feet elevation for the ideal climate. But not for people with heart trouble. Those with a weak heart are better oof in a mild climate closer to sea level, and one where extreme wind chills can be avoided.

Emphasema and bronchial asthma are both characterized by heavy mucous secretions and frequent blockage of the breathing passages. Many people with these ailments find relief through a change in climate to purer air and low humidity. Climatic conditions favorable for alleviating such ailments are to be found on the east slope of the Sierra Nevada and Rocky Mountains.

For children suffering with rheumatic fever, the cold and storminess of the Northern United States are definite obstacles to recovery, as well as increasing their chances of developing dangerous sore throats and colds. For these children, good locations are the calm, warm southern parts of New Mexico, Arizona and California.

For elderly people suffering from degenerative diseases - hardened arteries, diabetes, chronic nephritis - they may no longer be physically fit for the struggle it takes to survive northern winters. For them, refuge in southern climes with their slower-paced lifestyle may be preferred.

Hay fever sufferers are often helped by moving to pollen-free regions. A favorite choice is the Southwest where dust conditions generally

provide air free of pollen.

As a matter lega acknowledgement, the relationship between health and climate has been specified. A high federal court in 1961 ruled that a patient could deduct the cost of plane fare and an apartment in Florida during the winter on the basis that the individual had a history of four heart attacks and a cardiologists's recommendation that he go south for the winter months.

Individuals troubled by weather or climate should not move without the recommendation of a physician. Ideally, one should spend six months in a new place before making a permanent move. It is particularly important to determine whether adequate midical care is available there.

In practical terms, not many people who are troubled by weather conditions can uproot an entire family; give up a job or risk a change of employment, or afford the cost of moving. These individuals, plus those who would prefer not to move, need to learn how to cope with the weather conditions where they currently reside.

(G) Weather-condition Yourself!

It is generally agreed that for individuals having good health habits, even drastic changes in temperature, humidity, or barometric pressure will not affect them unduly. Medical climatologists and physicians recommend some rules to protect oneself against unfavorable elements:

1- Helmut Lansberg advises, "Try to keep adaptable to weather changes. Doctors used to advocate taking hot and cold showers. I still believe it's sound counsel. People who exercise outdoors and take morning cold showers probably survive longer than those who take pills." But a word of caution - talk with your physician about those procedures - especially if you are over sixty.

2- Each morning before leaving home, check your barometer or the weather report. If there has been a sharp drop in the barometer, prepare yourself for an 'off day'. Don't overexert yourself. Drive especially carefully. Don't permit a bad mood to control your actions or important decisions.

3- Stay home, if possible, should you suffer from asthma, emphasema, or heart disease if a sudden weather shift is predicted.

4- In cold weather, if you are thin, you are more apt to suffer physical and mental fatigue. Wear clothes that keep the body warm, but are loose enough to allow free circulation of air. This permits perspiration to evaporate. In extreme cold, the perspiration not evaporating could form frost within your clothes. This could then provide suitable circumstances for frostbite.

5- On hot days, wear light-colored loose-fitting clothese made of porous materials. Be advised that obese people who have difficulty withstanding intense heat, are more prone to heatstroke. Drink plenty of water; avoid liquor which can be dehydrating. When you return home from work, or elsewhere, lie down in the coolest spot and rest.

6- Don't expose yourself to the sun too much at one time. One can burn through a tan! Should you feel dizzy, nauseated, and have an acute headache, you may have heatstroke - call a doctor. If you suddenly stop perspiring, that may be a warning of heat stroke. Take a cool drink, summon a doctor. If your skin feels cool and clammy and you perspire profusely, you may be suffering from heat exhaustion. Cover yourself with a light blanket and drink warm tea of coffee - this will help your body return to its normal balance. If you are subject to heat cramps, drink lots of liquids. Your doctor may also prescribe salt tablets, especially when boating or fishing.

7- Bear in mind that sunlight is most intense at high noon, the hour before and the hour after. Overcast or hazy days don't necessarily eliminate the risk of sunburn: don't let them fool you! The reflected ultraviolet rays of water, especially, can be devastating. Cover up with a broad-brimmed hat, protective clothing, and effective sunscreen lotion.

8- When it storms, wear weatherproff outdoors clothing and rubbers to prevent exposure to chilling dampness. If you've been rain-soaked and feel chilled, take a hot bath. After thorough drying, cover yourself well with warm blankets to avoid rapid cooling: (N.B. - elderly people should first check with their doctor about proper bath temperatures for them).

(9) Realize that health and energy vary with the seasons. At

one's worst, worn down and more susceptible to illness = the months of January, Februaru, and March are particularly bad - especially if one lives in a northern climate. Ellsworth Huntington, an early climatologist, once remarked; "To speed up at the end of January is like expecting a tired horse to win a race." A vacation in winter should be taken, if at all feasible.

10- One can prepare one's own weather calendar. By keeping a day-to-day record for a year or so, one can plot one's reactions to environmental conditions. Such a record, if accurately and consistently maintained, can let one know on what kinds of day to perform simply routine tasks rather than tax oneself by tackling more complex assignments.

11- During hot weather, keep air-conditioning at a moderate level.

12- In cold weather, watch out for overly dry heating; consider adding humidification to your home.

Presently, much about weather and climate could have a pathological effect on people remains unexplained. René Dubos, professor emeritus at Rockefeller University, has indicated that "weather disturbances operate through physical factors which are still obscure", but he goes on to suggest that changes in hormone activity can be the root of our altered behavior.

As Helmut Landsberg concludes, "Most of us, brought up in a hot-house environment, are not elestic enough to adapt to weather quirks. True, a lot of mysteries remain to be solved. But once we understand what is known so far about the weather in relation to how we feel physically and mentally, we will understand ourselves much better."

In summary then - the following weather and behavioral interactions have been noted:

<u>Weather-Climate Changes &
Associated Behavioral Responses:</u>

1. Barometric pressure falling:

   a. Most car accidents occur.
   b. Blood moves along more easily to heart.
   c. Sharp drops associated with breath shortness.
   d. Angina suffereres adversely affected.
   e. Psychologically sensitive people sink into morose moods.

f. Suicide attempts more likely.

2. Barometric pressure low:

a. Increased sexual activity
b. Being uncharacteristically forgetfull.

3. Sudden, severe weather changes:

a. Greatest impact upon arthritics, headache suffers, asthmatics, heart disease patients, and mental illness sufferers.
b. Bring on strokes and hemorrhes.
c. Some 3 out of 5 heart attacks occurred when coldfront appeared abruptly and both thermometer and barometer dropped precipitously.

4. Summer months:

a. Common colds less likely.
b. Diarrhea more common.
c. Extreme heat a factor in heart ailments.
d. Lowest incidence of leukemia.
e. Eye disorders more likely to occur, when air is polluted.
f. Crime mounts.

5. Winter months:

a. Common colds more likely.
b. Constipation more prevalent; possibly due to less exercise and lower fluid intake.
c. Higher incidence of coronary occlusion or myocardial infarction (heart attacks).
d. Leukemia appears initially more often in winter.
e. More viral infections.
f. Temperatures averaging below 40° generally make women fertile.
g. Physical work; i.e. body efficiency, drops.

6. About winds:

a. Hot, arid sirocco brings sense of oppression.
b. Cold, dry mistral brings sense of opporession.
c. Warm, dry foehn brings general tensions; wounds become infected; sutures break; medical complications arise.
d. Spore-carrying winds lead to certain asthmatic attacks.
e. "Desert rheumatism" caused by airborne spores of fungi.
f. Pains of angina pectoris more severe during cold snap; cold winds; and on hot days.

7. About storms:

a. Susceptible people sense storms many miles away.
b. Some people become agitated and hyperactive.
c. Others feel drowsy.
d Hurricane, (abnormal weather condition) can affect mental performance.
e. Barometric pressures invariably low before a storm when the winds rise. Some people become edgy;some youngsters exhibit sudden vandalism rampage; some people become irritable or depressed; others wax enthusiastic!
f. Stormy weather changes can lead to local or total body chilling. In turn, this predisposes body to viral infections called colds.
g. Drug digitalis more toxic than under calm conditions.
h. Smaller doses of morphine were lethal than during quiet weather.
i Pain more common when weather is stormy and wet.
j. Storms may bring on criminally insane behavior.

8. About humidity:

a. Decreased air moisture harms individuals as does extreme cold.

b . Dry, cold winter days not as good for people as they seem to feel.
c. All temperatures other than extremely high, accompanied by moist days, are healthier than dry, low humidity days.
d. Heated rooms, extremely dry, (low humidity) can cause throat and nose irritations.
e. On dreary days, sky overcast and air very humid, crimes of violence soar.

9. About cold weather:

a. Thin people tend to react unfavorably to cold temperatures. Also become physically and mentally tired and lose customary pleasant dispositions.
b. More slender persons commit suicide than do stout people when cold, unsettled weather occurs.
c. Obese people better equipped to fend off winter's cold than are heavy-muscled individuals. But - they also are more vulnerable to frostbite and trench foot.
d. During severe cold weather arms, legs, feet, nose and ears more prone to frostbite.
e. Thin people more prone to keep higher skin temperatures.
f. Cold spell plus rain and snow can have transient effect as great as epidemic.
g. Flare-ups of some contagious diseases, such as influenza and viral infections such as colds.
h. Pains of angina pectoris more severe during a cold snap; cold winds and on hot days.
i. Hypertension: blood pressure usually rises.
j. Response to insulin slowed.
k. Diuretic users may become dehydrated.
l. Psychiatrists report increased episodes of violent behavior among the mentally institutionalized.

10- Mild winters:

a. Not unhealthy, despite commonly-held beliefs.

11- Sudden winter temperature changes:

a. Related to higher incidence of illness.

12- About hot weather:

a. Hot nights, sleep may elude individuals because body temperature does not drop.
b. Exceedingly hot weather reduces fertility, but sexual vitality seems high in late spring.
c. Boost the incidence of violence.
d. Is harmful to heart patients.
e. Among obese people their thyroid and endocrine glands do not function well.
f. For both thin and obese, both mental and physical performance adversely affected; often because individuals become irritable - lose temper readily with associates.
g. Less than six-month infants - extremely sensitive to heat.
h. Among adults over 65, their heat-regulatory mechanism begins to break down; they suffer when it is hot.
i. Hypertension - blood pressure tends to go down.
j. Women, in general, adjust more readily to hot weather.
k. Effectiveness of certain sleep-inducing drugs was reduced.

13- 'Heat wave' or 'hot spell'

a. Experience nausea, giddiness and general discomfort: may even faint.

b. Consequences of unbearable heat may be heat stroke; heat exhaustion, or heat cramps.
c. Prostration and death more likely to occur in cities,(i.e. city heat islands).

14- City heat islands:

a. Impact most evident on calm, clear evenings, a few hours after sunset when weak winds prevail/

15- About the sun's impact:

a. Many find serenity and feeling of vitality while enjoying warmth of sunshine.
b. Too much sun is a threat to health: medical authorities view tanning as a fad of psychological value; i.e. we believe we look physically fit and youthful.
c. Severe sunburn (first-or-second-degree burns) may result in agonizing pain. If widespread skin involved, poison reaction occurs throughout body resulting in shock, chills, fever, and even delirium.
d. Long-term exposure to sun can cause degenerative skin changes appearing as premature aging; breakdown of tissues can set stage for skin cancer.
e. Moderate amount of sunshine can benefit sufferers of psoriasis, eczema, acne, and pityrasis rosea.
f. Less pain when sunny and dry weather.
g. Psychologically sensitive people are elated in sunshine and depressed when cloudy.

16- Weather's impact upon ailments:

a. Some 92% of 160 polled doctors believe there is a significant relationship between disease symptoms and the weather. Many believe weather conditions worsen the condition of cold sufferers, arthritics, asthmatics, cardiac suffers, migraine headache sufferers, and various other ailments.

17- Sudden large temperature osailations:

a. If repeated on more than one occasion can precipitate a failure of thermo-regulatory mechanism which, in turn, results in a cold.

18- Combination of very damp weather and very heavy air pollution.

a. Worst cases of lung ailments like bronchitis and emphasema turn up.

19- Combination of very calm evening; clear skies; little wind, and stagnant, polluted city air.

a. For lung or heart ailment victums, this means trouble, for they respond adversely to these conditions.

20- Sudden cold waves:

a. Stomach ulcer sufferers have bleeding episodes.
b. Peaks of hemorrhages during October & November.
c. Heart attacks; the strain of adapting to weather changes.

21- Muggy or foggy spells:

a. Precipitating fact in heart attacks.

22- Heavy snowfall:

a. Exposure to, yields increased rate of immediate death among heart patients. Affects more women than men.

23- Change of air mass in any direction:

a. Helps trigger eclampsia (convulsions in late pregnancy).

24- Low barometric pressure days:

a. Children are most apt to be troublesome.

25- Rising barometric pressure days:

a. People look better and feel better.

26- A spell of continuing monotonous weather:

a. Many people become dejected.

27-Cool & dry, plus high barometric pressure:

a. Mental faculties function at peak efficiency.

28- Prolonged clear blue skies:

Mental faculties & productivity reduced.

29- Cloudy or rainy day, after a pleasant days period:

a. Work output is boosted.

30- Average temperature 64°, humidity about 65%:

a. "Ideal" weather conditions for work and health.

31-Sharp changes in atmospheric pressure; either direction:

a. Triggers "actional behavior"; i.e. more aggressive acts, self-destructive behavior; traffic & industrial accidents.

32- Swift weather changes:

a. Jittery before a storm breaks.
b. Affect emotional stability. Mental patients, temperamentally unstable become easily upset and fatigued during almost any atmospheric disturbance.

33- Weather seasonably comfortable; air dry and crisp:

a. Crime rate drops, precipitously.

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After three days men grow weary
of a wench, a guest, and weather rainy.
- Ben Franklin

If your head is wax, don't walk in the sun.
- Ben Franklin

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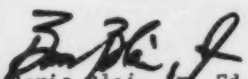

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